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★ OCT. - 1933 ★

U. S. DEPARTMENT OF AGRICULTURE

**MONTHLY LETTER OF THE BUREAU OF ENTOMOLOGY  
UNITED STATES DEPARTMENT OF AGRICULTURE****Number 232****Activities for July  
(Not for publication)****August 1933****NOVEL IDEA REGARDING PRESERVATION OF FIELD NOTEBOOKS**

Wm. P. Yetter, Jr., in charge of the field laboratory at Cornelia, Ga., has called attention to a method he has developed for preventing notebooks used in the field from getting dirty and wet with perspiration, as frequently happens in field work in warm weather. Both covers of the field notebook are covered with a layer of cellophane, which has been found to last the lifetime of the book. The top sheet of the book will then always be clean and will not blur. On the inside of the covers, information likely to be needed can be written in for ready reference, or the covers may be used as a place to carry loose papers, as diagrams, etc. Small maps too large to be inserted in the cover of the book may be similarly covered with cellophane.

**TOXICOLOGY AND PHYSIOLOGY OF INSECTS**

Diphenylene oxide promising insecticide for bean beetle and potato beetle.--M. C. Swingle, Takoma Park, Md., reports that "A supply of larvae of the Mexican bean beetle and the Colorado potato beetle were collected from the field in the past month (July) for rearing and testing insecticides. In all, about 800 larvae were used in dusting tests and a good supply was kept for rearing. \* \* \* Diphenylene oxide, nicotine 'bentonite,' and rotenone were tested on the bean beetle. Only the first compound was effective and it seemed very promising. Diphenylene oxide, nicotine 'bentonite,' manganese arsenate, and a 1 percent mixture of diphenylene oxide in kaolin were tested on the potato beetle. The manganese arsenate and the undiluted diphenylene oxide were both very effective."

**BEE CULTURE**

Cardboard sections unsatisfactory for storing honey.--E. L. Sechrist, Davis, Calif., reports: "Earlier in the season this office was the recipient of 50 cardboard sections sent for experimental purposes. The paper sections were very unsatisfactory, both in putting them up and in the final result. They were badly gnawed by the bees, the tops of the sections becoming fuzzy and unsightly. In folding the sections they tend to be out of square, the dovetails do not hold well, and the corner must be pasted together. It is difficult to put foundation into these diamond-shaped sections and after it is put in place the sections spring back

and loosen or bend the foundation, causing imperfect combs to be built. Possibly the faults of these sections can be overcome, as the faults originally present in the wooden sections have been overcome. Although these sections are cheap in first cost, the extra labor required in preparing them for use, the imperfect combs built, to say nothing of the inferior appearance of the sections, would rule them out for practical use."

#### FRUIT AND SHADE TREE INSECTS

Control of cloudy-winged whitefly with sulphur sprays and dusts.-- Ralph L. Miller, Orlando, Fla., reports that "In order to determine the effect of sulphur on the hatching and mortality of eggs and larvae of *Dialeurodes citrifolii* Morg., leaves heavily infested with eggs were sprayed and dusted with lime-sulphur and water, 1 to 50; lime-sulphur, iron sulphate, and water, 1-1-50; lime-sulphur, calcium caseinate, and water, 1-1/2-50; a wettable sulphur, 5-50; and sulphur dusts, wet and dry. Three weeks later counts were made of the numbers of eggshells and dead and live whitefly larvae on 20 1/4-inch squares on each plot. The results \* \* \* show that sulphur has a considerable toxic effect on the eggs and larvae of the cloudy-winged whitefly. \* \* \* Several very interesting and important points have shown up, as follows: (1) All forms of sulphur gave some control of the whitefly; (2) both iron sulphate and calcium caseinate increased the effectiveness of liquid lime-sulphur; (3) the wettable sulphur was not so effective (60 percent control) as lime-sulphur (69 percent control), but was more effective than a (dry) dust; (4) sulphur dust gave a fair degree of control (28.2 percent of eggs and larvae) when applied to dry foliage; (5) sulphur dust applied to wet leaves gave better control (71.5 percent of eggs and larvae) than did liquid lime-sulphur spray used 1 to 50 (69.0 percent)."

Bordeaux mixture on pecan trees increases infestation by black pecan aphid.--"In July there was a decided increase in the infestation of the pecan black aphid in pecan orchards generally, and especially in orchards where trees were sprayed with Bordeaux mixture alone," reports G. F. Mozzette, Albany, Ga. "Actual counts made during the month in experimental areas under observation show that where Bordeaux mixture has been applied for pecan scab control the population showed on an average 10 times as many aphids per compound leaf as where no spray was applied. Apparently the environmental conditions in pecan trees are changed, following Bordeaux applications favorable to aphid increase. It may be that photosynthesis is altered, CO<sub>2</sub> assimilation changed, etc., producing this condition. Observations made to date do not indicate that the color of Bordeaux mixture on the foliage attracts the aphids to sprayed trees. Predators, such as ladybird beetles, lacewing flies, etc., have been about as numerous on the trees under observation before spraying as after, and at no time have they been sufficient in numbers to keep aphids down."

Effect of light intensity on activity of oriental fruit moth.--Reporting on meteorological conditions as influencing fruit-moth activity, L. F. Steiner, Cornelia, Ga., says, "Apparently light in excess of 25 or

30 foot-candles will practically stop adult activity, as will complete darkness. The meter in use will measure from about 0.2 to 500 foot-candles. Activity appears to be greatest when the light intensity is less than 0.5 foot candle, the intensity which generally occurs a half hour before sunrise or after sunset. Light reaching the meter from the east, west, and overhead was measured. After sunrise or before sunset on a clear day light intensity may increase or decrease several hundred foot candles per hour. Of 304 moths captured on the four days 277 were taken between 7 and 9:30 p.m., 1 during the day, and 26 between 4 and 5:30 a.m. Temperatures below 60°F. prevented activity on two of the mornings. About 217 of the moths entered the traps a few minutes before or after the 8 p.m. examinations."

Bait traps reduce oriental fruit moth infestation.--Although the large-scale bait-trap experiments for the control of the oriental fruit moth (Grapholitha molesta Busck) have been continued, W. P. Yetter, of the Cornelia, Ga., field laboratory, has conducted a smaller experiment in a small, partially isolated peach orchard during the present season, and was also able to determine the degree of infestation by the fruit moth in two other orchards in which bait traps had been maintained for comparisons of baits, as well as in a number of comparable unbaited orchards. The reduction in injury appeared to be 47 percent in one orchard, 77 percent in a second, and 78 percent in the third. This indicates that a considerable degree of control of the fruit moth is possible by baiting small areas. "The benefits from baiting on a small scale are not cumulative from year to year because of the extensive interorchard movement of moths. Continuance of the baits after harvest would be practical only where large areas are baited. Bait trapping as practiced in one orchard would have cost the growers this season not more than \$3.50 per acre, all expenses included."

Low temperatures following woolly aphid attack cause "die-back" of perennial canker.--M. A. Yother, Wenatchee, Wash., summarized his observations on the relation of the woolly apple aphid (Eriosoma lanigerum Hausm.) to perennial canker of apple, as follows: "Accurate bimonthly records, in 1932, of woolly aphid infestation in some 300 3-year old calluses have given some rather definite results. In general it may be stated that: (1) Die-back, or extension, of perennial canker callus usually follows prolonged and heavy woolly aphid infestation of the callus followed by severe winter temperatures; (2) die-back sometimes follows even milder, shorter periods of woolly aphid infestation followed by severe (zero or sub-zero) temperatures; (3) die-back of perennial canker calluses usually occurs only at points on the callus where woolly aphid infestation occurred the previous season; (4) the die-back of the callus is often of greater extent along the periphery than the previous extent of the woolly aphid infestation; (5) light or temporary (2 weeks or so) woolly aphid infestation is only rarely followed by die-back, or extension; (6) it has not yet been definitely established by the writer that the perennial canker organism is responsible for what is here termed 'die-back' of the

callus, but the evidence is rather conclusive, as this characteristic annual dying back of the callus occurs only in canker-infected orchards; (7) die-back of callus does not appear where the woolly aphid has been absent from natural causes or on account of effective treatment the preceding season; (8) die-back of perennial canker callus does not seem to follow woolly aphid infestation without severe winter temperatures, neither does it appear to result from low temperatures alone without previous aphid injury."

#### JAPANESE BEETLE AND ASIATIC BEETLE RESEARCH

Japanese beetle attracted to blueberry field from distance.--F. W. Metzger, Moorestown, N. J., reports as follows: "Interesting data have been obtained from the collections made from the traps placed at one-tenth mile intervals in the woods north of Tranquillity blueberry field. The trap located one-tenth mile from the field captured approximately one-half as many beetles as did the trap located 5 yards from the blueberry plants. The trap two-tenths mile from the field captured approximately one-fourth as many as the trap located one-tenth mile from the field, whereas the trap three-tenths mile from the blueberry plants captured approximately the same number of beetles as the trap two-tenths mile distant. The traps four-tenths and five-tenths mile from the field captured approximately the same number of beetles, but the number is approximately double that taken in the trap located three-tenths mile from the field. These data are interpreted as follows: The blueberry plants and the traps surrounding the field attract beetles to the field from a distance of approximately three-tenths mile, as indicated by the larger number of beetles taken nearer the field. At a greater distance, however, the traps located near the field have little effect on the normal infestation in the woods. This is further borne out by the fact that beetles have been noted feeding in large numbers on alder at a distance of approximately four-tenths mile from Tranquillity field."

#### TRUCK CROP AND GARDEN INSECTS

Wireworm larvae endure starvation well.--R. S. Lehman, Walla Walla, Wash., reports on starvation experiments in which "100 larvae were each placed in separate salve tins containing pure sand (silicon dioxide) from Sept. 11, 1931, to July 28, 1933. \* \* \* The results show that one of the larvae survived for at least 1 year 9 1/2 months without food of any kind."

Control of wireworms by submergence.--E. W. Jones, Walla Walla, states that "Flooding for 4 days in July with soil temperatures above 75° F. will reduce wireworm populations 88 to 93 percent." The species involved was Limonius californicus Mann.

Parasitization of European earwig in Northwest.--S. E. Crumb, of the Puyallup, Wash., field laboratory, reports that "Parasitization of earwigs has continued steadily and about 5,000 have been infested by hand

methods. In a recent talk with the man who has had charge of the earwig parasite work in Portland for several years it was learned that the parasitic fly Digonochaeta setipennis Fall. is well established in that area and that flies and parasitized earwigs are now recovered miles away from the point at which parasites were liberated some years ago. Earwigs are scarce in Portland this year but the part played by the parasite in this reduction is uncertain. The outlook for control of the earwig through parasites is hopeful."

Lethal effects of dihydrotrotenone not impaired by sunlight.--R.E. Campbell and J. C. Elmore, Alhambra, Calif., report that "A small quantity of dihydrotrotenone was exposed to direct sunlight on glass for 30 hours and 48 imported cabbage worms (Ascia rapae L.) were fed sandwiches containing this material. Five worms that ate the smallest quantities received. .008, .014, .008, .010, and .015 milligram per gram of body weight and none of them recovered. These dosages compare favorably with a median lethal dose of .012 worked out for these insects with dihydrotrotenone."

Ratio of sexes of sand wireworm.--According to J. N. Tenhet, Fairfax, S. C., "Horistonotus uhleri Horn maturing in the cages prove that the ratio of males to females is approximately 50 to 50. Field collections of adults and trapping upon tanglefoot screens indicate that the proportion of males to females is at least 25 to 1, but this apparent discrepancy must be explained by the fact that the females spend only a very small portion of their lives above ground. They burrow into the soil within a few minutes after mating and apparently remain in the soil most, if not all, of the remainder of their lives."

Lima bean pod borer assured abundant breeding places.--Rodney Cecil, Ventura, Calif., states that "The wild host plant Lupinus arboreus has matured one set of pods this season and during the month (July) began to send out new flower shoots and set a second crop of pods. This is the first time that this plant has been noted as setting two crops of pods during a season. The second set of pods on this wild host plant will provide additional breeding places for the lima bean pod borer (Etiella zinckenella Treit.)"

Hosts of the beet leafhopper in California.--W. C. Cook, Modesto, Calif., summarizing data obtained during the past 3 years on hosts of Eutettix tenellus Bak., states that "the following conclusions have been reached: (1) Atriplex expansa is a rather poor summer host. It carries quite heavy populations for one generation in June, but later in the season rarely carries half as many bugs as do either A. bracteosa or Russian thistle, the last two hosts being practically even in possibilities, varying somewhat in different seasons; (2) populations on weed hosts tend to remain nearly on a level from July 1 to September 1, followed by a rapid increase in the fall generations; (3) summer collections by all of our various methods in three seasons indicate a normal excess of females.

This may be due to an actual difference in the sex ratio when adults mature or may be due to the fact that the females live longer than the males. This is not true in the fall generation, which normally runs between 60 percent and 65 percent males."

#### FOREST INSECTS

Solar heat effective control for western pine beetle.--J. M. Miller, Berkeley, Calif., reports that "A summer control program against the western pine beetle (Dendroctonus brevicomis Lec.) is now under way on the Bass Lake Unit of the Sierra National Forest. A crew of about 25 men from Sugar Pine Camp (F-90) have been assigned to treat summer brood trees by the solar heat method. Up to July 31, 275 trees, with a total volume of 243,190 board feet, had been treated. It was found that field temperatures during July were highly effective in producing 100 percent mortality whenever the bark received even brief exposures to the sun at midday."

Elm leaf beetle gains footing in Yosemite Park.--Mr. Miller also states that "Elm trees (Ulmus americana) were planted in the valley floor of Yosemite at the time of early settlement, probably about 1880. These planted trees now compose part of the parking in the old Yosemite Village. In 1932 these elms were defoliated by Galerucella xanthomelaena Schr., and during the summer of 1933 the beetle has been so abundant as to defoliate completely all planted elm trees in the Park. Just how the elm beetle reached this locality is a question, but very probably it was carried in by auto campers. The elms are isolated by many miles of mountainous country from the localities where this beetle occurs in the San Joaquin Valley, and the possibility of its flight into Yosemite is a remote one."

Clean-up of Crater Lake National Park forests effective in controlling pine beetle.--Reporting on cooperative control work, F. P. Keen, Portland, Oreg., says: "Using nearly the entire force of the 400 Civilian Conservation Corps workers assigned to Crater Lake National Park, an exhaustive beetle clean-up campaign was conducted over the 30,000 acres comprising the susceptible pine areas of the Park. The work was completed shortly after the end of the month, at which time the more advanced broods of the mountain pine beetle (Dendroctonus monticolae Hopk.) had just reached the new adult stage. Last year 20,311 infested pines were treated on this area. This year a diligent combing of the area by 4 spotting crews resulted in finding only 6,161 infested pines, a reduction of 70 percent. In fact the Park forests are now so free from mountain pine beetle infestation that a 2-day inspection of the treated areas failed to reveal a single living beetle."

More on winter mortality of mountain pine beetle.--A. L. Gibson, Coeur d'Alene, Idaho, reports that in June he "found that an exceedingly heavy winter mortality had occurred in the broods of the mountain pine beetle in the Beaverhead National Forest. In July Mr. Gibson extended his examinations to include an additional number of areas both on and

adjacent to this forest. As a result of these examinations, it is now known that throughout the area examined a very large percentage of the overwintering broods have been destroyed, and perhaps this can best be explained by the extremely low temperatures of the past winter. To the south of the Beaverhead, the mortality begins to decrease and in the Wyoming National Forest, where control was conducted this spring, there was little evidence of abnormal mortality. This fact can be explained only by the absence of killing temperatures. It is expected that in all areas where this mortality occurred there will be a marked reduction in this season's infestation. With this information at hand, plans are being made for the institution of surveys throughout the Yellowstone Park, and the Targhee, Teton, Wyoming, Cache, and Caribou National Forests, with the idea of determining the extent of this season's infestation for the purpose of instituting artificial control."

Tree medication does not destroy parasite of mountain pine beetle.--W. D. Bedard, Coeur d'Alene, reports that "Although larvae and adults of the mountain pine beetle can be killed by injecting western white pine trees with a solution of sodium arsenate, this treatment does not destroy the parasite Coeloides dendroctoni Cush. This parasite is practically restricted to the trees attacked by the beetle in June, because of the synchronization of the two seasonal histories. The Coeloides larvae, therefore, have sufficient time to complete feeding by the time the trees are injected in late August and September. Examination of the June trees medicated in 1932 showed that these beneficial insects completed development and emerged."

Habits of pine tip moth.--L. G. Baumhofer, Coeur d'Alene, states that "In a study of the habits of Rhyacionia neomexicana (Dyar) in the Nebraska National Forest it was found that most of the larvae, when mature in late June and early July, do not drop from the infested tips, but crawl down the bole of the tree to spin up at the base. This was determined by banding sapling pines with tanglefoot and placing tanglefoot screen under the crowns of other trees. Migration occurs during the night."

Grasshoppers damage pines in Nebraska.--Mr. Baumhofer also says that "grasshoppers were again numerous enough in the Nebraska National Forest to cause serious damage to young pine plantations. The Forest Service, as in the past 2 years, carried on control to protect the extensive area of pines planted in early spring, treating a total of about 900 acres."

Exorista mella Walk. failed to develop on gipsy moth.--R. T. Webber, Melrose Highlands, Mass., submits the following paragraph based on studies he made in July: "No elaborate host relation studies of Exorista mella and Porthetria dispar L. were possible because of the scarcity of E. mella. There were, however, a limited number of P. dispar larvae (all in last instar) obtained from field collections infested with E. mella eggs. These larvae were isolated and the development of the parasite observed daily. Nearly all of the larvae pupated and gave

moths, not a single parasite being recovered. The data obtained clearly indicate that eggs deposited when the host larva is in an advanced stage and about ready to pupate are too late to enable the maggot to develop successfully. The egg hatches and the maggot readily penetrates the skin of the host and forms its integumental funnel. It does not, however, pierce the newly formed 'pupal skin', and is consequently cast off with the exuvium when the larva pupates."

#### CEREAL AND FORAGE INSECTS

Lesser corn stalk borer attacks string beans.--Geo W. Barber, Savannah, Ga., reports that "A serious infestation of Elasmopalpus lignosellus Zell. in young string beans was observed this month (July) and moths and parasites were reared for reference. When the plants have from two to five leaves the larva, which, when full grown are about three-fourths inch long, and green-blue in color, enter at a point even with the surface of the soil, or a little below the surface. They burrow up and down the stem, hollowing it and causing the plants to die. When one plant has died and dried so as to be unsuitable as food, the larvae move to a new plant. Apparently they feed only within the plant stems, making an effective control rather difficult."

Egg-deposition period for European corn borer in Lake Erie Section for 1929-1933.--"The first corn borer egg mass was found on June 22," reports L. B. Scott, of the European corn borer laboratory, Toledo, Ohio, "but, as it hatched on the 23rd, it is evident that it was deposited on the 18th or 19th. The peak of egg deposition occurred on or about July 1, which is about the average date for this area. Egg observations ended on July 22, when the number of masses found was so small as to indicate that practically all adults had died. The end of the oviposition period in this section normally occurs about July 24. The following table indicates the oviposition data for the years 1929 to 1933, inclusive, in northwestern Ohio:

	<u>First egg mass</u>	<u>Peak of oviposition</u>	<u>Last egg mass</u>
1929	6-20	7-8	7-29
1930	6-16	7-11	7-25
1931	6-19	7-3	7-22
1932	6-16	6-3	7-28
1933	6-19	7-1	7-22"

Life cycle of red harvester ant in western Texas.--According to E. V. Walter, San Antonio, "Females of Pogonomyrmex barbatus F. Smith were obtained from swarms emerging June 14 and June 19. They were placed in observation cages for notes on the life cycle. These notes show that 11 to 12 days are required for the egg period, 9 to 10 days for the larval period, and 9 to 12 days for the pupal period, a total of from 30 to 32 days from the time the egg is laid until the young adults emerge. It is also shown that the female deposits from 40 to 70 eggs in the first group and that from 6 to 12 eggs may be found to each young hatching therefrom, so that about 6 or 7 young may be reared from this first group

of eggs. A few days after the first young adults emerge they forage for food, consisting of grass and weed seeds. At about this time the female begins to lay eggs again and the larvae from these eggs are apparently fed largely on the pulverized seed."

Lubricating oil shows promise as substitute for water in grasshopper baits.--Reporting on experiments "to test the value of a cheap lubricating oil as a substitute for water and molasses in the standard bran-mash grasshopper bait," J. R. Parker, Bozeman, Mont., says: "Large plats were poisoned with the various baits and one feeding period allowed before the first collections. Four more successive collections, consisting of live hoppers swept from the poisoned plats, were made 24 hours apart. Each collection was placed in a screen cage and was supplied with green feed. The percentage of hoppers dead at the end of 3 days was taken as the percentage of kill for the day on which the collection was made. \* \* \* The oil used in the above experiments was a low-grade lubricating oil of 40 viscosity and was used at the rate of 2 gallons to 100 pounds of bran. F. A. Morton, working at Mohall, N. Dak., obtained an excellent kill in a large, heavily infested flax field using 2 gallons of a lighter oil to 100 pounds of bran, but 1 1/2 gallons of the same oil to 100 pounds of bran, applied on dry sod breeding grounds of Cannula pellucida Scudd., did not give as good kills as the water-molasses baits."

Charlottesville field laboratory discontinued.--The field laboratory formerly located at Charlottesville, Va., was discontinued, effective July 31 last. The scientific personnel and projects have been transferred to Arlington, Va., where they are being continued under the direction of F. W. Poos.

#### COTTON INSECTS

Pink bollworm control.--C. S. Rude, Tlahualilo, Mex., reports on "the progressive rate of the mortality of Pectinophora gossypiella Saund. under varying conditions from Dec. 29, 1932, to and including May 16, 1933. Seven sets of soil conditions were studied: Bolls buried 4 inches on December 10 without irrigation; bolls buried 4 inches on December 10 and irrigated; bolls left on soil surface without irrigation; bolls left on soil surface and irrigated; bolls left on soil surface to March 4 and then buried 4 inches without irrigation; bolls left on soil surface to March 4 and then buried 4 inches and irrigated; and bolls left on standing stalks. \* \* \* The bolls used were found to have an average larval population of 332 larvae per each 100-boll sample on Dec. 10, 1932, the time the test was started. \* \* \* Burial followed by irrigation in December was most effective. The data obtained also show that neither burial nor irrigation alone is effective in reducing over-winter survival, but that a combination of the two is required. A certain amount of moisture is, however, essential to high survival. In the case of bolls left on the surface and not irrigated, the greater part of the dead larvae observed were completely desiccated. As the mortal-

ity in bolls left on plants was lowest, standing cotton stalks should be considered a dangerous factor in increasing the winter survival of the pink bollworm in the Laguna district."

Diluted calcium arsenate gives good control of boll weevil.--Experiments conducted last year to reduce the quantity of calcium arsenate needed for boll weevil control in the coastal plains sections where arsenical poisoning of the soil occurs, are being repeated this year at Florence, S. C. F. F. Bondy reports that he is obtaining very good weevil control, based on square infestation and blooms produced, by mixing hydrated lime with calcium arsenate. One part of calcium arsenate with 1 and 2 parts of lime are giving almost as good control as straight calcium arsenate, and a 1 to 3 mixture is giving fair control. Early "mop-pings" of 1-1-1 molasses-calcium arsenate-water mixture alone failed to control the weevils, although 3 early applications of the mixture followed by calcium arsenate dusting was slightly better than dusting alone. M. T. Young, Tallulah, La., reports that no marked difference has yet been shown in the square infestation records of the plats where calcium arsenate, 1 part to 1 part lime, and 1 part to 2 parts lime, is being used.

Natural control of the boll weevil.--The effects of heat, parasites, predators, and other means of natural control on the boll weevil are shown by data submitted by H. C. Young, Eufaula, Okla. The boll weevil infestation was so light throughout June and July that much of the older cotton suffered very little damage and set a good crop of bolls. During June and the first half of July the weather was very hot and dry, the temperature reaching 108.5° F. on July 11, and was over 100° F. on 8 of the first 12 days of July. This was followed by 3.48 inches of rain and by cooler weather for the rest of the month. In July representative samples of weevil-infested squares (fallen and hanging) were collected from a number of fields and examined to determine the percentage of dead weevil stages and the cause of the mortality. The data obtained explain why the weevil infestation increased so slowly during this period. During the hot, dry weather of early July more than 90 percent of the weevils in the fallen squares were killed, 71 percent being killed by heat. With the rains and cooler weather during the latter part of the month, the mortality dropped to about 32 percent in the fallen squares, less than 2 percent being attributed to heat. With the moderation in the weather the increase in mortality by predators, parasites, and proliferation was very noticeable, the parasitization increasing from 3.47 percent to 12 percent. The mortality in hanging squares was never as high as in the squares on the ground (fallen) and the effects of the change in climatic conditions were not so pronounced. The percentage of parasitization in the hanging squares was consistently much higher, ranging from 27 percent to 50 percent, and did not vary as much as in the fallen squares. Parasites were also abundant in the Lower Rio Grande Valley of Texas, but scarce in the Mississippi Delta. T. C. Barber, Brownsville, Tex., reports for July 3 to 24 that 31 percent of the weevils in fallen squares and 27 percent of those in fallen bolls were par-

asitized. P. M. Gilmer, Tallulah, La., who has had a large series of squares from different soil types and environments under observation, found a maximum of 5 percent parasitization and an average of only 1 percent parasitization in squares caged in July. At Tallulah all the parasites except two (unidentified) were Microbracon mellitor Say. Parasitism is correlated with heavy woods nearby and a good weed growth about the field edges.

#### INSECTS AFFECTING MAN AND ANIMALS

Diking a possible control for two species of sand flies.--"At Fort Pierce, Florida, a diking experiment is promising for control of larvae of Culicoides dovei Hall and C. melleus Coq. in a mangrove marsh," states W. E. Dove, Savannah, Ga. "From 6 weeks to 2 months after the inundation with river water, small numbers of sand fly larvae were found along the edge of the water of the diked area. After that time larvae were not obtained in such collections of soil samples. Recently, and after a period of more than 4 months, the water level was allowed to drop for about 2 feet, to permit reconstruction and enlargement of the dam. Collections of soil samples from the new edge of the water failed to show any larvae, although collections from the ditches and elsewhere furnished numbers of them. We interpret results as promising for control of breeding places of C. dovei and C. melleus, the most important sand flies of the mangrove marshes."

Mosquito control gives relief to unemployed.--W. V. King, Orlando, Fla., reports that "On July 20, at the request of the Director of Relief for Polk County, two areas in the county were inspected with a view to instituting mosquito control projects. At Haines City a marsh area of about 1,000 acres, bordering the city, appeared to be a potential source of prolific mosquito breeding. Several years ago this had been placed in a drainage district and a main canal with a few laterals had been dug. At the present time, however, the canals are in very poor condition as a result of heavy aquatic growths and the washing in of dirt. The cleaning of the canals, at an estimated cost of \$5,000, and the cutting of additional laterals was recommended as a desirable project for the employment of labor on the relief funds. At present 105 men per week are being given employment in the district. A brief survey of conditions in the Fort Meade district showed two principal sources of mosquito breeding, one being numerous phosphate pits that have become overgrown with water hyacinth; the other, rather extensive marshy areas along Peace River and various branch streams. Several points in the district were reported to be quite malarious. While mosquito control work is evidently needed, no definite recommendations could be made without a more detailed survey, and this has been arranged for the early part of August. Some 70 to 80 men per day are now being given employment under relief funds."

Resistance of male and female house flies to kerosene-pyrethrum spray.--Roy Melvin, Dallas and Menard, Tex., reports that "Tests were con-

ducted to determine if there was a sex difference in the resistance of the house fly (Musca domestica L.), to kerosene extract of pyrethrum. Ten lots of flies of various sex ratios were each sprayed with 0.7 c c of a kerosene-pyrethrum extract. Four hours after spraying, the dead flies were removed, counted, and the sex was determined for a sample of 500. The live flies were killed, counted, and the sex was determined for a sample of 500. It was noted that the females were markedly more resistant to kerosene-pyrethrum extract than were the males."

#### STORED PRODUCT INSECTS

Time of planting peas as affecting weevil infestation.--T. A. Brindley, Moscow, Idaho, reports that "peas planted on June 22, the 12th weekly planting in the series to determine the influence of the time of planting on the extent of weevil infestation, have remained practically free from weevil injury."

Flour mills fumigated by piped system show good kill.--Geo. B. Wagner, Kansas, City, Mo., reports the fumigation of two mills, using liquid hydrocyanic acid through the new piping system. In the first experiment "The mill closed down at 5 p. m. Elevator boots were cleaned, and the ends of the conveyers, where large quantities of accumulated stocks were located, were also cleaned. Ventilators were sealed and the mill closed. The gas was placed in the mill at 6:30 p. m. and at 5:40 a.m. the mill was opened." The exposure for 11 hours at optimum temperature and humidity, using a dosage of 5 ounces, resulted in a kill of 99.4 percent. In the other mill the temperature was 85° to 86° F., the humidity 41 to 51 percent, the wind velocity from 4 to 20 miles per hour. The dosage used was approximately 6 ounces of liquid HCN; the period of exposure, 12 hours; and the resultant kill, 95 percent. Mr. Wagner says, "When using the machinery piping method of fumigation it is important to make sure the feeder gates above the rolls are open and that no accumulations are above these feeder gates. It is also very important that the ventilators on the air suction lines are well sealed, for these are directly connected to every machine in the mill, and if they are not sealed a perfect outlet is provided for the gas."